

Abstract of Dr. Mayr's Monograph on the Synergi of the
Oak-galls : by FRANCIS WALKER.

The history of the inhabitants of galls is less understood than that of other parasitic Hymenoptera, their proceedings hid from sight and their mutual intercourse difficult to discover. But Dr. Mayr is now investigating them thoroughly with regard to the oak-galls of middle Europe, and a translation of some of his published observations may be a help to the knowledge of the British species. The difference between galls in close contiguity is remarkable, and it is not known whether this difference is effected by the peculiar egg laying of each gall-making species, and by the fluid which accompanies that proceeding. The following notice is limited to the Synergi, which establish their families in the galls, and thereby interfere more or less with the originators of them, though in some galls the Synergi have an outer life in the superficial part, and the gall-makers have an inner life in the central part. In Dr. Mayr's descriptions he indicates here and there much difference in size and colouring, and even in sculpture in one species, and thus the identification of some kinds is difficult. More references can be made to his monograph when the British species are better known ; of these three species *S. Reinhardi*, *S. facialis*, and *S. Tscheki* may be frequently seen, the first in the Devon gall, the second in the oak apple, the third in the oak spangle. It will be seen that in some cases one kind of *Synergus* inhabits several different galls, but it has not been ascertained that its character is thereby modified. The three following genera are closely allied and form one group in the family.

Synergus.

All the face streaked fan-like. Antennæ of the male 15-jointed, of the female 14-jointed ; third joint in the male more or less dilated, in two species tumid. Furrows of the front generally reaching to the side-ocelli, seldom short ; prothorax without longitudinal furrows in the

middle; scutellum with two deep cavities at the base; first abdominal segment ring-shaped, with a forked longitudinal streak; the large segment consisting of two wholly united segments. Radial areolet fully closed.

Sapholytus.

Face, prothorax, scutellum, and abdomen as in *Synergus*. Antennæ 14-15-jointed in the male, 13-jointed in the female; third joint dilated in the male. Furrows of the front very short. Radial areolet open by the foreborder which the radial vein does not reach.

Ceroptres.

Face only feebly streaked on the sides; a straight keel from each socket of the antennæ to the border of the mouth. Antennæ in the male 15-jointed, with the third joint not dilated nor thickened; in the female 12-jointed, somewhat thickened towards the tips. Front without furrows. Prothorax in the middle with two hindward converging longitudinal furrows. Scutellum at the base without any, or with two slight cavities. First abdominal segment ring-shaped, smooth; the large segment has a transverse suture before the middle, and thus forms two segments, of which the first is more or less hairy. Radial areolet closed.

SYNOPSIS OF THE SPECIES OF SYNERGUS.

- A. Second abdominal segment broadly and fully punctured on the whole hind border. Larvæ in the galls during winter.
 - a. Second joint of the antennæ shorter than thick in the male, as long as thick in the female. Head luteous; front and vertex black. Eye borders yellow. *melanopus.*
 - b. Second joint of the antennæ distinctly longer than thick.
 - * Hind legs black; sutures and tarsi yellow. Face black.
 - † Mesothorax roughly and transversely wrinkled,

especially roughly punctate wrinkled on the side angles. Face with a very conspicuously strong longitudinal middle keel. Frontal furrows ending by the side-ocelli. Wing veins stout, mostly dark brown. *Reinhardi*.

†† Mesothorax with far apart sharply concise wrinkles, between which the surface is smooth and shining. Face with a slight middle longitudinal keel, or with none. Frontal furrows usually disappearing before they reach the ocelli. Wing veins pale yellow. *evanescens*.

** Hind legs yellow, chestnut red, or somewhat brownish.

† Radial areolet distinctly more than twice as long as broad. Wing veins pale yellow.

‡ Head and thorax wholly black. Hind femora ferruginous, or blackish-brown. Front with rough wrinkle like punctures. *pallidipennis*.

†† Head luteous, with some black spots between the ocelli. Front finely coriaceous, wrinkled with scattered punctures. Sides of the prothorax and mesothorax in the male almost always, in the female occasionally luteous. Femora of the male yellow, of the female brown. *flavipes*.

†† Radial areolet not twice as long as broad.

‡ Hind femora black or brown. Wing veins stout, brown. Face of the male wholly, or at least below yellow, of the female wholly black, or yellow below. Upper side of the first joint of the antennæ in the male mostly with brown or black marks. *Hayneanus*.

†† Hind femora chestnut red or brown. Wing veins very pale. Face black. First joint of the antennæ yellow. *ruficornis*.

B. Second abdominal segment not punctured, or only so on the hind border.

α. Third joint of the antennæ in the male thickened or dilated towards the tip, not swollen.

* Mesothorax with transverse sharp more or less undulating keels, and with smooth or almost smooth intervals. Furrows of the front most often not extending to the ocelli.

- † Antennæ of the usual thickness.
- † Hind border of the second abdominal segment not much curved in the female.
- § Apical joints of the antennæ often slightly brownish in the female. *variabilis.*
- §§ Apical half of the antennæ dark brown in the female. *apicalis.*
- †† Hind border of the second abdominal segment much curved in the female. *rotundiventris.*
- †† Antennæ thickened. *incrassatus.*
- ** Mesothorax transversely wrinkled or coriaceous. Furrows of the front always extending to the ocelli.
- † Hind femora in the female at least dark coloured.
- † Body deep black.
- § Wings with more or less pale veins. *Tscheki.*
- §§ Wings with brown veins. *tristis.*
- †† Body not deep black.
- § Abdomen black.
- * Wings with extremely pale veins. *pallicornis.*
- ** Wings with testaceous veins. *albipes.*
- *** Wings with brown veins.
- o. Second joint of the antennæ a little longer than thick in the male, distinctly so in the female. *nervosus.*
- oo. Second joint of the antennæ as long as thick or a little thicker in the male, as long as thick or a little longer in the female. *vulgaris.*
- §§ Abdomen ferruginous or castaneous. *varius.*
- †† Femora and tibiæ pale in both sexes.
- † Head reddish testaceous. *facialis.*
- †† Head black. *radiatus.*
- b. Third joint of the antennæ much swollen in the male.
 - * Third joint of the antennæ excavated on the outer side in the male. *thaumacera.*
 - * Third joint of the antennæ only slightly emarginate on the outer side in the female. *physocerus.*

SYNOPSIS OF THE SPECIES OF SAPHOLYTUS.

- A. Antennæ 15-jointed in the male. *connatus.*
- B. Antennæ 14-jointed in the male.

- a. Third joint of the antennæ twice as long as the fourth. *Haimi.*
 b. Third joint of the antennæ not twice as long as the fourth. *undulatus.*

CEROPTRES.

- A. Face with two acute longitudinal keels. *arator.*
 B. Face with two obtuse and sometimes indistinct longitudinal keels. *Cerri.*

LIST OF THE FLIES WHOSE GALLS ARE INHABITED BY THE PRECEDING SPECIES.

1. Synergus melanopus.

Cynips argentea.	Cynips polycera.
„ hungarica.	„ caliciformis.
„ tinctoria.	„ amblycera.
„ Kollari.	„ caput-medusæ.
„ lignicola.	„ calicis.
„ conglomerata.	Aphilothrix lucida.
„ glutinosa.	„ gemmæ.
„ coriaria.	„ clementinæ.

2. Synergus Reinhardi.

Cynips argentea.	Cynips caliciformis.
„ tinctoria.	„ caput-medusæ.
„ Kollari.	„ calicis.
„ glutinosa.	

3. Synergus evanescens.

Cynips calicis.	Aphilothrix gemmæ.
Andricus multiplicatus.	

4. Synergus pallidipennis.

Cynips tinctoria.	Cynips coriaria.
„ lignicola.	„ conifica.

5. Synergus flavipes.

Dryocosmus macroptera,

6. *Synergus Hayneanus.*

<i>Cynips tinctoria.</i>	<i>Cynips Kollari.</i>
„ <i>lignicola.</i>	

7. *Synergus ruficornis.*

Aphilothrix globuli.

8. *Synergus variabilis.*

<i>Cynips cerricola.</i>	<i>Synophrus politus.</i>
„ <i>circinans.</i>	<i>Andricus nitidus.</i>
<i>Dryocosmus cerriphilus.</i>	„ <i>grossulariæ.</i>
„ <i>macroptera.</i>	<i>Neuroterus lanuginosus.</i>

9. *Synergus apicalis.*

<i>Cynips lignicola.</i>	<i>Andricus noduli.</i>
„ <i>conglomerata.</i>	<i>Aphilothrix gemmæ.</i>
„ <i>amblycera.</i>	

10. *Synergus rotundiventris.*

Dryocosmus macroptera.

11. *Synergus incrassatus.*

<i>Aphilothrix radiceis.</i>	<i>Aphilothrix Sieboldi.</i>
„ <i>corticis.</i>	

12. *Synergus Tscheki.*

<i>Dryophanta scutellaris.</i>	<i>Neuroterus lenticularis.</i>
„ <i>divisa.</i>	„ <i>fumipennis.</i>
<i>Neuroterus numismatis.</i>	„ <i>ostreus.</i>

13. *Synergus pallicornis.*

<i>Cynips Hartigi.</i>	<i>Cynips polycera.</i>
„ <i>argentea.</i>	„ <i>caput-medusæ.</i>
„ <i>hungarica.</i>	„ <i>calicis.</i>
„ <i>tinctoria.</i>	<i>Dryophanta folii.</i>
„ <i>Kollari.</i>	„ <i>longiventris.</i>
„ <i>lignicola.</i>	„ <i>divisa.</i>
„ <i>conglomerata.</i>	„ <i>agama.</i>
„ <i>glutinosa.</i>	„ <i>disticha.</i>
„ <i>coriaria.</i>	„ <i>cornifex.</i>

14. *Synergus albipes.*

<i>Biorhiza synaspis.</i>	<i>Andricus curvator.</i>
<i>Dryophanta agama.</i>	<i>Spathegaster baccarum.</i>
„ <i>disticha.</i>	„ <i>tricolor.</i>
„ <i>divisa.</i>	<i>Cynips seminationis.</i>

15. *Synergus varius.*

Biorhiza renum.

16. *Synergus nervosus.*

<i>Aphilothrix autumnalis.</i>	<i>Aphilothrix callidoma.</i>
„ <i>collaris.</i>	

17. *Synergus tristis.*

<i>Aphilothrix urnæformis.</i>	<i>Neuroterus ostreus.</i>
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18. *Synergus vulgaris.*

<i>Cynips tinctoria.</i>	<i>Aphilothrix solitaria.</i>
„ <i>lignicola.</i>	„ <i>globuli.</i>
„ <i>glutinosa.</i>	„ <i>callidoma.</i>
„ <i>caput-medusæ.</i>	„ <i>clementina.</i>
„ <i>calicis.</i>	„ <i>urnæformis.</i>
<i>Aphilothrix gemmæ.</i>	„ <i>glandium.</i>

19. *Synergus facialis.*

<i>Cynips glutinosa.</i>	<i>Andricus ramuli.</i>
„ <i>seminationis.</i>	<i>Dryoteras terminalis.</i>
<i>Aphilothrix solitaria.</i>	<i>Spathegaster baccarum.</i>
„ <i>albopunctata.</i>	„ <i>tricolor.</i>
„ <i>curvator.</i>	

20. *Synergus radiatus.*

<i>Aphilothrix albopunctata.</i>	<i>Andricus ramuli.</i>
„ <i>solitaria.</i>	<i>Spathegaster baccarum.</i>
<i>Andricus curvator.</i>	

21. *Synergus thaumacera.*

<i>Biorhiza renum.</i>	<i>Andricus cydonicæ.</i>
<i>Cynips cericola.</i>	<i>Spathegaster tricolor.</i>

Trigonaspis megaptera.	Spathegaster glandiformis.
Andricus singularis.	„ nervosa.

22. *Synergus physocerus*.

Biorhiza synaspis.

1. *Sapholytus connatus*.

Andricus noduli. Aphilothrix inflator.

2. Sapholytus Haimi.

Andricus nitidus. *Neuroterus saliens.*

Neuroterus lanuginosus.

3. *Sapholytus undulatus*.

Cynips cerricola.

1. *Ceroptus arator*.

Cynips lignicola.	Cynips galeata.
„ hungarica.	Andricus noduli.
„ Kollari.	Dryoteras terminalis.
„ conglomerata.	Aphilothrix lucida.
„ glutinosa.	„ urnæformis.
„ polycera.	Spathegaster flosculi.
„ caliciformis.	„ aprilinus.

2. Ceroptres Cerri.

Cynips cerricola.	Andricus multiplicatus.
Dryocosmus macroptera.	„ crispator.
Andricus circulans.	Spathegaster glandiformis.